**Chemical Science – Expert group member 3**

**Q) Explain what occurs when a candle burns.**

1. When you light a candle, the first thing that happens is that the wick burns---the braided cotton ignites and starts to burn, but once the heat from the wick is sufficient to start melting and then vaporizing the wax, it is the wax that starts to combust since it burns at a lower temperature than the wick. Capillary action continues to feed the wick with more melted wax that vaporizes and burns as it gets to where the flame is located. As the wax source gets farther and farther from the top of the wick, the capillary action is no longer able to beat gravity and so the wick eventually either carbonizes from lack of oxygen and breaks off or completely combusts.

**Q) How can you demonstrate the reaction that is occurring?**

A) For the physical changes that happen to the candle (melting and then going back to solid) a simple experiment like using water could suffice to help students understand the change, this can be done by placing water into the freezer, then taking it out and seeing it melt then vice versa.  
In most chemical reactions, two or more substances, called reactants, interact to create different substances called products. This can be demonstrated to the students by placing a glass jar big enough to place over the candle. The flame will more than likely go out. This is because it has limited the amount of oxygen in the air around the candle. Without enough oxygen to react with the wax, the chemical reaction cannot take place and the candle cannot burn. When a candle burns, the candle wax seems to “disappear.” It doesn’t really disappear, though: It reacts chemically, and the new products go into the air.

**Q) Explain how cars pollute the air.**

1. When you drive your car, it releases carbon dioxide as waste into the air. Carbon dioxide in the atmosphere makes what is called a greenhouse gas. It stays in the atmosphere and does not let heat out so the earth warms up. Also the carbon dioxide in the air damages plants, soil, and water which affect the ecological balance of the planet and screws up our resources needed to simply live. Also oxides of nitrogen, which are also released from the car, react with compounds in the air to cause acid rain. Acid rain is rain that contains chemicals that destroy forests, aquatic life, and other things. All of this messes up the earth and threatens to destroy what we need to live.

**Q) Use this understanding of burning to explain how cars pollute the air.**

A) An internal combustion engine uses fuel by mixing it with air and then burns it. When this happen, some exhaust gases are left over. They go out the tailpipe and into the air.

Smog is what happens when the exhaust gases mix with sunlight. The more people drive, the more smog cars produce. One of the problems with cars is the burning of fuel which produces carbon dioxide in the air. The extra carbon dioxide helps trap the sun's heat on earth.

**References:**  
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